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(57) Abstract:

PROBLEM TO BE SOLVED: To obtain a member, useful as the one used in a production process for semiconductors and excellent in dimensional retention accuracy for a stress and a temperature changes, suppression of damage to a silicon wafer and prevention of particles from sticking by forming a titanium oxide film of a specific composition on the surface of a silicon nitride or sialon

having a specific average thermal expansion coefficient as a substrate and composing the member.

SOLUTION: This ceramic composite film is composed by forming a TiO_2 -x $[2 > (x) > 0]$ film or a film comprising a mixture composition of the TiO_2 -x and TiO_2 having the thickness of preferably $\leq 1\%$ that of silicon nitride or sialon as a substrate which is a dense sintered compact, obtained by adding a sintering assistant, e.g. Y_2O_3 , Al_2O_3 or MgO in the total amount of $\leq 15\%$ to the silicon nitride or sialon and sintering the resultant mixture by atmospheric sintering, gas pressure sintering or hot isostatic press (HIP) sintering and having $\geq 95\%$ relative density and $\leq 1.5 \times 10^{-6}/^\circ\text{C}$ average thermal expansion coefficient between 20 and 50°C on the surface of the substrate.

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